

PRODUCT CATALOGUE



ADVANCED ELECTRONIC APPLICATIONS, INC.

P.O. Box C2160, LYNNWOOD, WASHINGTON 98036, U.S.A.

AEA Computer Patch^{T.M.} Interface model CP-1

Now you can easily convert your personal computer and transceiver into a full function RTTY station with the new CP-1 Computer Patch^{T.M.} interface by AEA and appropriate AEA software and cabling. The CP-1 is a professional quality RTTY/CW terminal which cuts no corners on sensitivity, selectivity, and reliability. Software packages include split screen operation and large type-ahead and message (brag) buffers at all the common RTTY and CW speeds.



The CP-1 Computer Patch^{T.M.} is easy for an inexperienced RTTY operator to hook up and operate, but will still appeal to the more experienced and sophisticated RTTY user. The CP-1 is a moderately priced, high performance, feature packed unit, which utilizes reliable innovative design in the style you have come to expect from Advanced Electronic Applications. It is priced competitively with other popular units, but includes many extras not offered by them.

With the tremendous price drop in personal computers, your total system cost is far below that of dedicated RTTY/CW systems which offer few, if any, additional features. No computer programming knowledge is required to use the CP-1 with your computer and you will still have the opportunity to use your personal computer for a variety of unrelated functions.

The CP-1 demodulator provides greatly improved performance compared to popular single channel RTTY detectors. An easy to use AEA magic-eye bargraph tuning indicator gives the closest thing to scope tuning, but separate Mark/Space scope output jacks are also provided. A state-of-the-art multi-usage active filter is incorporated offering pre and post limiter filtering. Floating comparator (automatic threshold) circuits give the best possible copy under fading and weak signal conditions.

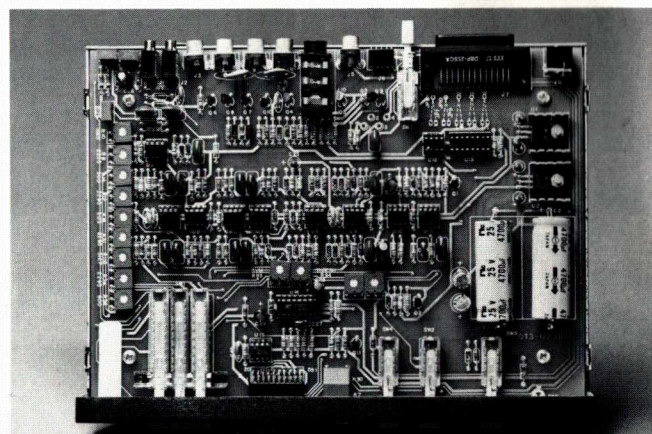
Additionally, the CP-1 offers a variable receiver shift capability for any shift from 100 to 1000 Hz with a NORMAL/REVERSE tone selector switch on the front panel.

A function generator chip is utilized for clean,



stable sine wave AFSK tone output to the transmitter. Both plus (+) and minus (-) keyed output jacks are provided for CW keying of virtually any popular transceiver. Automatic transmit/receive switching is available under computer control or from a front panel manual transmit button. Output and computer control signals are available in the usual TTL levels (or RS-232 format with an optional low cost RS-232 kit).

Power requirement for the CP-1 is 16 VAC which is provided by a 117 VAC wall adaptor unit supplied with the CP-1. The CP-1 Computer Patch^{T.M.} is housed in an attractive all-metal enclosure with extensive R.F. filtering for minimal R.F. susceptibility or radiation, far exceeding Part 15, subpart J, FCC requirements. The CP-1 measures 10" wide x 2 3/4" high x 8 1/4" deep and weighs approximately 1 1/2 pounds.



For software package information, please ask your dealer or contact AEA. Take advantage of the new low cost/high performance ratio and find out why RTTY is the fastest growing segment of amateur radio. See your favorite dealer for a demonstration of the CP-1 today.

Prices and specifications subject to change without notice or obligation.

AEA Brings you the Breakthrough!

MOSCOW MUFFLER^{T.M.}

WOODPECKER NOISE BLANKER



The AEA model WB-1 Moscow Muffler™ Woodpecker Blanker represents the latest of many AEA breakthroughs. This blanker is the first to offer effective blanking of the Russian Woodpecker signal with **no modifications** to the receiver.

The WB-1 is designed to be connected in the antenna feedline between the antenna and the receiver. The WB-1 effectively blanks the interfering pulses before they have been stretched out by receiver tuned circuits, thereby causing the least amount of distortion possible.

Because the WB-1 is a synchronous blanker, it simply **does not** overload from strong adjacent channel signals. The overload condition is a **significant problem** with all I.F. blankers, making the Moscow Muffler the most effective Woodpecker Blanker under crowded band conditions.

In addition to the superior blanking features, the WB-1 offers an effective **low noise**, broadbanded **6 db R.F. preamp** with + 13 dbm intercept point. The preamplifier may be switched in or out whether or not the WB-1 is in the blanking mode.

The WB-1 Moscow Muffler Blanker is available in a transceiver version (model WB-1C) which features a

carrier operated relay (COR) for automatic transfer from receive to transmit.

The WB-1 features a pulse blanking width control for reducing the blanking width to the minimum width necessary to achieve maximum blanking. The minimum blanking width will assure the **minimum** signal distortion that must result from placing holes in the received signal.

Blanking of both 10 Hz and 16 Hz Woodpecker modes is achieved with the WB-1. At the time this brochure is being written, most Woodpecker transmissions are made with a 10 Hz pulse repetition rate.

The WB-1 is simple to operate and **one of the most effective blankers** of Russian Woodpecker signals that we have been able to test, including the most popular blankers built into modern transceivers. The WB-1 will typically display 40 to 50 db of Woodpecker signal attenuation with **no overload** from strong adjacent channel signals.

The WB-1 comes with a 90 day limited warranty and is backed by the same AEA customer service that has earned AEA a prominent position in the amateur radio market.

AEA Brings you the Breakthrough!

Prices & specifications subject to change without notice or obligation.

Advanced Electronic Applications, Inc. • P.O. Box C-2160 • Lynnwood, WA 98036 • (206) 775-7373 • Telex: 152571 AEA INTL

MBA READER^{T.M.} by AEA

The new MBA (Morse-Baudot-ASCII)-RO (Reader Only) is a complete multi-code decoder and display unit that is all you need (other than a 12VDC source) to copy Morse and RTTY signals directly from your stable communications receiver.

The MBA-RO is ideal for SWLs, beginning hams, operators striving for higher code speeds, and for monitoring news or weather broadcasts even while at sea.

For the active amateur radio operator, the MBA Reader provides an excellent means of allowing guests the opportunity to sample the thrill of Morse or RTTY operation. Likewise, it provides a unique way of demonstrating amateur radio in public.

The MBA Reader contains a built-in 32 character vacuum fluorescent display that presents any copied message moving from right to left across the display window. Large blue characters allow for minimum eye fatigue after long periods of viewing. There are no noisy mechanical parts to wear out or break down. There is also no requirement for a roll of teletype paper that can eventually cause a mess in the operating room. Important messages can be recorded on a standard tape recorder for future reference.

Nothing (economically) can match the interpretive skills of the human brain that has been trained in the art of Morse code copying, and no electronic Morse code reader can match the ability of a skilled CW operator when copying at or near the noise level. However, the MBA Reader's computer can make optimized dot, dash and spacing decisions. When copying at or near the noise level the MBA-RO excels when compared to other much more expensive machines. The MBA Reader will also copy Morse code at speeds higher than has ever been possible for a human operator.

A tremendous advantage offered by the MBA-RO is the opportunity for post-copy editing thanks to the 32 character display. This is particularly useful in reading long, complex sentences. This difference becomes particularly evident during high speed CW copy or for RTTY (especially 110 Baud ASCII) monitoring. With a 32 character display even 100 wpm RTTY is a snap to read.

The MBA-RO comes with a built-in inverter power supply that allows for portable operation from a 12VDC power source. An optional UL approved AC power adapter, AEA model AC-1, is also available for operation from 117VAC. The MBA Reader power input circuit is protected against inadvertent reverse polarization of the input power leads.

An attractive, rugged and compact metal package is designed for minimum R.F. radiation and susceptibility problems.

The MBA-RO uses the receiver audio output with no special modifications necessary. Any standard output impedance will drive the MBA Reader, and a TTL level or switch closure (hand key or keyer) will likewise do the job. The unit is



simple to hook-up and simple to use, no bulky CRT or printer is required.

Morse code (CW) signals are enhanced by a built-in 100 Hz wide filter centered on 800 Hz. Tuning is made easy with an LED tuning indicator. The filter can be switched out for copying a signal that is drifting, or for operating at a different tone pitch when using the receiver's own filter.

Dual mark and space RTTY filters are provided in order to achieve the inherent noise rejection advantages of RTTY operation. The narrow shift filters are factory tuned for 170 Hz shift (used in most amateur transmissions) while the wide shift filters are factory tuned for 425 Hz shifts (used in most news broadcasts). They can be easily tuned in the field, for any other shift desired. In RTTY operation, the CW filter position can be used instead of the RTTY positions to tune only the space frequency for various frequency shift signals. This is the only mode offered by some competitors. It has the advantage of flexibility in tuning different frequency shift signals, but the disadvantage of much less noise immunity!

An adjustable CW and RTTY threshold control with a dual LED tuning indicator for RTTY operation also improves the operator's ability to copy signals close to the noise.

An automatic speed indication can be switch selected. The speed appears in the four right most characters of the display and thus reduces the message display to 28 possible characters when it is selected.

There is no need to select a CW speed operation range. The MBA-RO has an exclusive automatic speed tracking feature that will follow the most drastic speed changes, as are encountered when normally tuning across the band. This feature makes receiver tuning easier, because you do not have to be concerned that the computer is still trying to "catch-up" to the new speed while tuning.

A very useful feature of any good code reader is the ability to provide instant feedback of one's own sending proficiency. This is particularly true in the case of proper spacing. All too often (even with skilled operators) words run together without a sufficient word space between, or there are inadvertent spaces sent within words. These errors can be seen on the large 32 character display, and can be easily corrected after practicing a few hours with the MBA Reader.

Specifications

Speed: Automatically tracks Morse code from 3 wpm to 99 wpm.

Baudot RTTY speeds are: 60 wpm, 67 wpm, 75 wpm, and 100 wpm.

ASCII RTTY SPEED: 110 Baud.

Input Impedance: Will match virtually any receiver or audio amplifier output impedance.

Integrated Circuits: 17, plus one microcomputer.

Power Requirement: 13 VDC $\pm$ 2 VDC at 500 ma.

Dimensions: 8-3/4" x 5-7/8" x 2".

Net Weight: Approximately 2 lbs.

AEA
Brings you the
Breakthrough!

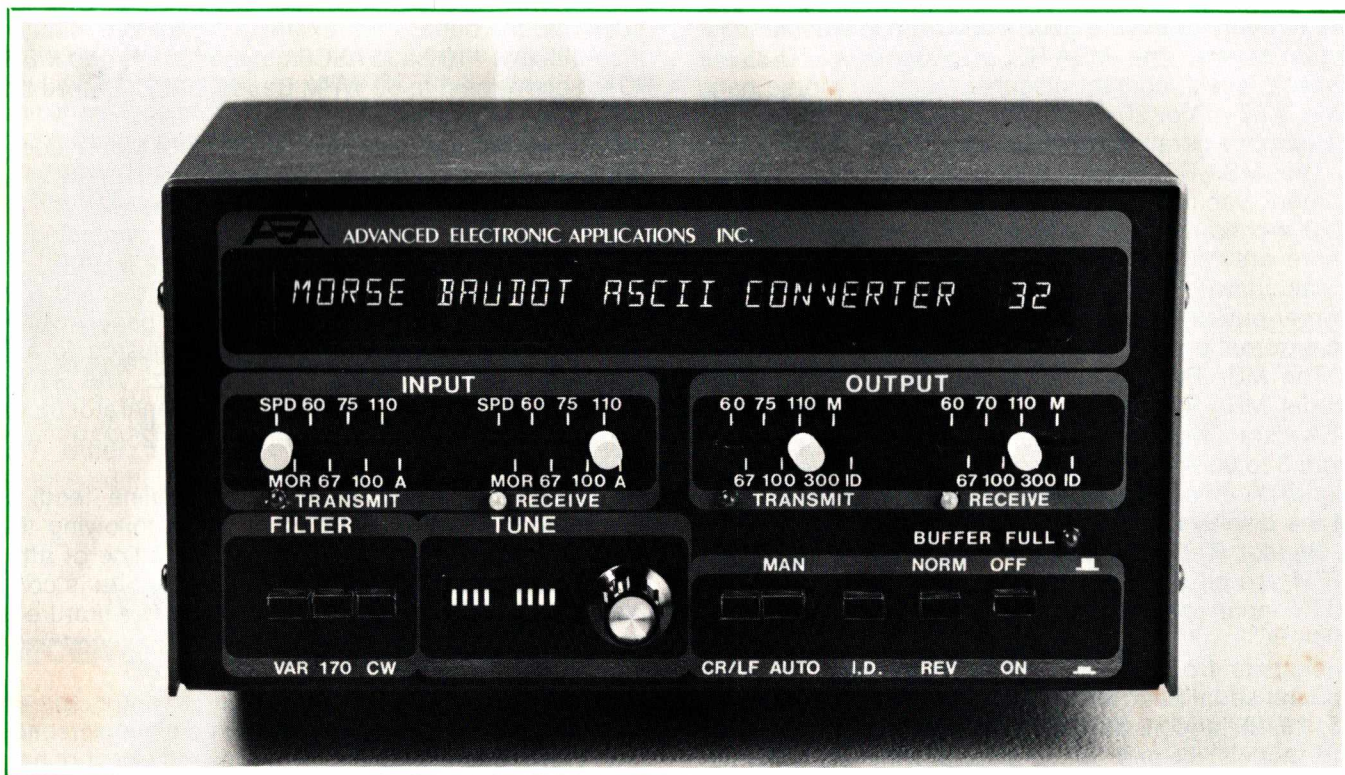
Prices and Specifications subject to change without notice or obligation.

Advanced Electronic Applications, Inc. • P.O. Box C-2160 • Lynnwood, WA 98036 • (206) 775-7373 • Telex: 152571 AEA INTL

MBA-RC Reader^{T.M.}

Code Converter

by



The new model MBA-RC (Morse, Baudot, ASCII Reader/Code Converter) represents another significant breakthrough in data communications equipment from Advanced Electronic Applications, Inc. The MBA-RC is actually several sophisticated devices all wrapped up in one package.

The unit performs as a full function **decoder and display** unit for Morse, Baudot (teletype) and ASCII (teletype/computer) coded signals. The MBA-RC operates directly from the audio output of any stable communications receiver, with no other accessories necessary except a 12 VDC source. The MBA-RC also encompasses a feature-packed **Morse, Baudot and ASCII encoder and code converter**. The unit will perform **serial to parallel and parallel to serial** code conversions as well as cross-mode conversions. All the necessary analog processing and tone generation for two way contacts in any of the MBA codes is included in the standard unit.

Two powerful AEA microcomputers, 43 integrated circuits, and all the associated circuitry comprising the MBA-RC are contained within one compact and handsomely designed package. The package takes up little extra operating space and lends itself nicely to portable two-way RTTY operation from a 12 VDC source.

Morse, Baudot and ASCII Reader Features

The MBA-RC incorporates very advanced analog signal processing circuitry for allowing maximum readability of weak or interfered with signals. The MBA-RC is compatible with all the standard HF, VHF and UHF Amateur RTTY modes (plus non-encrypted news or weather broadcasts). Separate receive filters are positioned ahead of and behind a special signal limiting circuit (pre and post limiting filters).

A four-pole two stage active CW filter can be front-panel tuned for any audio frequency between 300 Hz and 2KHz. RTTY (Baudot or ASCII) signals are processed by separate Mark and Space filters for maximum noise and interfering signal rejection. The RTTY filters are tuned for a fixed 170 Hz shift (2125 Hz Mark/2295 Hz Space) or a front panel selected variable shift from 100 to 1000 Hz (2125 Hz Mark/2225-3125 Hz Space). A normal/reverse switch is provided for receiving RTTY on the opposite sideband (upper). Separate Mark and Space tuning LED's are provided on the front panel. For operators having an oscilloscope handy, separate Mark and Space signal outputs are available for conventional scope tuning.

MBA-RC Reader^{T.M.}

Code Converter

by



Sufficient amplification is provided in the MBA-RC input circuitry to ensure good copy from low audio input signal levels. The MBA-RC also accepts TTL input voltage levels, contact closures (such as Morse hand key), a 60 mA or 20 mA keyboard loop, serial (ASCII or Baudot), or parallel ASCII inputs.

The MBA-RC comes with a 32 character alpha-numeric vacuum fluorescent display. Each character is 0.29 inches high. No external CRT or TV is required. There are no noisy mechanical parts to wear out or break down during normal monitoring. However, Printer output is available for obtaining hard copy with an external printer when it is desired.

The MBA-RC has most of the features of the AEA model MBA-RO (reader only) including the exclusive AEA instant Morse automatic speed tracking capability from 3 to 80+ WPM. The speed of the received Morse signal is computed and can be displayed at the far right of the display at the completion of each word.

Baudot RTTY input speeds of 60, 67, 75 and 100 WPM are all accepted by the MBA-RC reader. ASCII RTTY input speed of 110 Baud is also copied by the MBA-RC.

Outputs from the MBA-RC can be used to drive popular serial Baudot Teletype printers such as models 15, 19, 28, and 32 or ASCII teletype machines such as the models 33 and 35. In addition, the MBA-RC will drive most of the popular parallel ASCII printers such as Epson and Centronics.

MBA-RC Encoder Features

Any standard Baudot or ASCII parallel keyboard, a current loop, even two-tone AFSK can be used to drive the MBA-RC. Regardless of the type of input, any of the three output codes can be generated at any of the MBA-RC available output speeds. Morse code input from a hand key, bug, keyer or memory keyer (even a Morse keyboard), can be instantly converted to Baudot or ASCII two-tone RTTY output for driving a SSB transmitter at the audio input jack. It will also drive FSK transmitters from a transistor keyed output port. When used with a Morse memory keyer, high speed RTTY transmissions can be made without the need of a keyboard.

Any Morse, Baudot or ASCII input code can be converted to any of the three output (Morse, Baudot or ASCII) codes. Also, any available specified MBA-RC input speed can be converted to any available specified MBA-RC output speed. A 1000 character dynamic storage buffer is particularly useful for code conversions from high speed inputs to low speed outputs (such as 110 Baud ASCII to 20 WPM Morse). A buffer

limit LED will indicate when you are about to type too much into the buffer - For example, about five minutes of continuous 110 Baud ASCII can be fed into the MBA-RC for conversion to 60 WPM Baudot output before the buffer limit LED comes on.

The MBA-RC will transmit 1 to 99 WPM Morse code. The output speed for Morse can be set from an ASCII or Baudot keyboard by typing \$NN, such as \$25 for 25 WPM. A built-in CW sidetone monitor including a speaker is also standard equipment in the MBA-RC.

A built-in AFSK tone generator is also featured with 170 Hz or 850 Hz shift selected by a rear panel switch. Either of the shifts can be internally adjusted to any other shift between 100 and 1000 Hz. The AFSK generator uses a clean, stable function generator (not a 555 timer) that is factory tuned to 2125/2295 and 2125/2975 Hz.

An automatic CR/LF (carriage return/line feed) is generated in receive or transmit mode following the first word space after 64 characters on a line or after 72 characters if no space occurs. This feature is commonly referred to as word wrap-around. The feature is easily defeated with a front panel switch for such things as receiving RTTY pictures.

An anti-space (mark-hold) mode is automatically enabled after about a second of continuous space tone. This mode eliminates the undesired effect of having a printer running "open-loop". Another convenient feature is automatic down shift on space for Baudot reception or transmission. Otherwise known as USOS (unshift on space), it is independently selectable for transmit and/or receive on the rear panel.

An automatic station identification memory message is offered in the standard MBA-RC which can be activated by a front panel switch. The output generates less than a 50 Hz tone shift as well as a simultaneous CW keyed output. It can also be used for standard BAUDOT or ASCII message transmission.

An external contact closure applied to a rear panel jack will automatically change the selected input and output modes from receive to transmit.

General MBA Features

The MBA-RC is packaged in an attractive metal enclosure with a handsome front panel that is humanly engineered for easy operation. Operating status indications are provided for Morse speed, Mark and Space tune, and transmit and receive active modes in operation.

A built-in high and low voltage inverter power supply allows operation from an external 12 volt power source. The unit is diode protected against inadvertent reverse

MBA-RC Reader^{T.M.}

Code Converter

by 

polarization.

Radio frequency interference is a prime consideration in all AEA designs and the MBA-RC is no exception. This unit is designed for absolute minimum susceptibility to rf and for minimum rf radiation from its two microcomputers (far exceeding requirements outlined in part 15, subpart J of the FCC rules and regulations).

No point-to-point wiring is evident in the MBA-RC as a continuing effort to increase reliability. We also use high quality glass epoxy printed circuit boards. Like other AEA microcomputer-based products, the MBA-RC receives a full elevated temperature oven burn-in before a complete final test prior to shipping. All the measures taken to ensure the highest level of quality in our other successful product lines are likewise employed in the production of the MBA-RC.

MBA-RC Specifications

RECEIVE

Display: Blue 32 character vacuum fluorescent with 0.29 inch high, 14 segment characters.

Modes: Morse Code, Baudot RTTY, ASCII RTTY

Speed: Automatically tracks Morse Code from 3 to 80+ WPM, Baudot RTTY speeds: 60, 67, 75, 100 WPM, ASCII RTTY: 110 Baud.

Filtering: Four-pole variable CW filter front-panel tuned from 900 to 950 Hz. Can also be used for SPACE ONLY RTTY tuning.

RTTY 170 Hz Fixed (2125 Mark/2295 Space) Reverse/Normal switch.

RTTY Variable 100 to 1000 Hz Shift (2125 Mark/2225-3125 Space).

Input Impedance: Approximately 5K Ohms. will work with virtually any receiver or audio amplifier output impedance.

Printer Outputs: Serial (current loop) Baudot such as teletype models 15, 19, 28, and 32.

Serial current loop ASCII such as teletype models 33 and 35. Parallel ASCII such as EPSON and CENTRONICS.

Automatic CR/LF: (defeatable) after first space following 64 characters or after 72 continuous characters (word wrap around).

USOS: Automatic down shift on space (defeatable).

Anti-Space: Mark-hold after continuous space tone.

TRANSMIT

Modes: Morse code, Baudot RTTY, ASCII RTTY.

Output Speed: Morse 3-99 WPM

Baudot RTTY 60, 67, 75, 100 WPM

ASCII RTTY 110 Baud

Keying Outputs: CW: Cathode Keyed (to 200 ma.) grid block (to -300 volts) or solid state transmitters.

RTTY: Photo-isolated contact closure, TTL level transistor switch, or two tone AFSK 170 Hz shift (2125 Mark/2295 Space), 850 Hz shift (2125 Mark/2975 Space).

Inputs: Morse: from hand key, bug, keyer, memory keyer, Morse keyboard.

RTTY: Two tone ASCII or Baudot AFSK, Parallel (TTL compatible) or serial ASCII or serial Baudot.

Automatic CR/LF: (switchable) after first space following 64 characters or after 72 continuous characters.

USOS: Down shift on space (switchable).

Auto I.D.: Less than 50 Hz Morse shift from programmable I.D. memory. Can also be used for standard Morse, BAUDOT or ASCII message transmissions.

GENERAL

Power Requirement: 13 VDC + 2 VDC at 1.2 AMPS.

Integrated Circuits: 43 IC's plus two custom AEA microcomputers with copywritten firmware.

Size: 8¾" W x 4½" H, x 7" D

Weight: Approximately 5 lbs.

Prices and Specification subject to change without notice or obligation. All MBA-RC Software © Copyright by AEA.

AEA BT-1 MORSE CODE BASIC TRAINER



Advanced Electronic Applications, Inc. has achieved the dominant position in computerized Morse Code keyers, readers and trainers.

All our previous Morse Code trainers have been **proficiency** trainers that are meant for improving the speed copying ability of operators that **already** know the Morse Code. The BT-1 Basic Trainer was designed for the person having **no proficiency** in the Morse Code. The BT-1 introduces each character individually in a well-researched sequence (by Educational Technology & Services, Inc.) that avoids confusion with other characters and permits maximum practice of characters that are difficult to learn.

Each new character is introduced by itself until the student is completely familiar with its sound. The trainer then mixes the new character 50% of the time against all previous characters learned in a similar manner. The characters are mixed first in groups of 2, 3, 4 and finally 5 characters before the student progresses to the next new character. The characters are sent at 20 words per minute with a three second space between character groups. The three second pause can be easily changed to any desired delay from .01 to 9.9 seconds.

The BT-1 is a completely self-paced trainer that requires **no instructor**. It can even be used as a code practice oscillator for improving one's sending fist.

For the serious Morse Code student, it is possible to achieve a 20 WPM copying speed in as little as one month with the BT-1. Most students can achieve good results by practicing 20 minutes in the morning and 20 minutes in the evening each day. We know of no other teaching methodology that is even close to the efficiency of the BT-1 in training new Morse Code operators, providing a student truly concentrates during practice sessions.

The BT-1 is a perfect adjunct for any amateur radio class. It allows the instructor to spend most of his time teaching theory while at the same time producing top quality Morse operators.

Operation of the BT-1 is straight forward and easily learned. All operations are selected via the top panel keypad and ON/OFF volume control. Power is derived from any 12 Volt DC power source capable of delivering 200 mA. An earphone jack is also provided for private practice sessions.

The Basic Trainer is also available in a portable version, the BT-1P. The BT-1P features a built-in NICAD battery pack that allows for a couple of hours of operation between charges. The BT-1P comes with the mating charger unit.

AMT-1 Amtor Terminal Unit by **AEA**



A Milestone in Amateur Radio Communication

- Full AMTOR error correcting data communication facilities **plus** RTTY, ASCII and CW (transmit only).
- Operates with most HF transceivers and home computers (or data terminals).
- Mode and configuration control from the terminal keyboard or by computer program control.
- 16 LED Panadaptor type tuning indicator plus status indicators for all operating modes.
- Crystal controlled AFSK sine wave function generator and 4-pole active receive filter.
- Microprocessor based with transmit and receive data buffers.
- Operates from a simple 12V power supply.
- Lower cost than many similar units which do not offer AMTOR.

AMT-1 Amtor Terminal Unit

by 

What is AMTOR?

AMTOR (Amateur Teleprinting Over Radio) is a micro-processor controlled error correcting data communication system. It allows virtually error free data transmission between suitably equipped amateur radio stations. This is possible even under conditions of severe interference and fading. Sometimes, error free communication is possible, even though signals are not discernible to the human ear through noise and QRM.

Based on CCIR recommendation 476 and adapted for amateur use by G3PLX, AMTOR is now permitted by many national administrations. Some hundreds of stations are currently active, mostly on 20 meters — where the characteristic CHIRP of AMTOR ARQ signals may frequently be heard.

On the H.F. marine bands, SITOR (the marine equivalent of AMTOR) is used extensively for error free ship-to-shore telex communication.

AMTOR CODE DEFINITION

Unlike standard 5 unit RTTY, AMTOR uses synchronous transmission of a 7 bit code. This 7 bit code provides 2^7 , or 128, possible code combinations. 35 of these codes are constant ratio combinations which have four positive and three negative elements. The ratio is tested on each received character. If it is incorrect, the received character is rejected as erroneous.

Of the 35 available constant ratio codes, 32 are used as alphanumeric teleprinter codes. The remaining three are assigned as special function codes.

Data transmission is at 100 Bauds, which corresponds to a character length of 70ms. If a code combination is received which does not correspond to a 4:3 positive/negative ratio, the code is rejected at the receiving end and is not sent to the terminal.

AMTOR MODES

ARQ

In this automatic error correcting transmission mode, the sending station transmits three characters as a block in 210ms. It then pauses for 240ms, during which the receiving station transmits a single acceptance code. If the information has been received incorrectly, a "request for repeat" (RQ) code is issued. On receipt of an RQ, the sending station repeats the three character block until the receiving station finally transmits an acceptance code, after which the next block of three characters is sent. A third control character is also available to cause the

direction of sending to be reversed, allowing the receiving station to reply.

By its very nature, ARQ mode can only operate between two mutually synchronized stations. ARQ transmissions between two other stations can, however, be monitored by the AMT-1, when set to ARQ listen mode.

ARQ demands reasonably fast transmit/receive and receive/transmit switching times at both transmitting and receiving stations. Because ARQ transmissions have a 50% duty cycle, most transceivers do not have to be operated at reduced power levels, unlike normal RTTY.

FEC

This mode allows transmission to several stations simultaneously, and is an excellent mode for CQ calls. It does not incorporate the full error correcting capability of ARQ, but each character is transmitted twice, and the receiving station can pick out the good character in a pair if the other one is mutilated. The received error rate is thus significantly lower than normal RTTY. If both transmitted characters in a pair are mutilated, no character is printed by the receive terminal unit.

The second character in a pair is separated by 350ms from the first. This enables the system to handle bursts of interference of up to 350ms with no printed errors. The transmitter must operate at 100% duty cycle.

ARQ Listen

This mode allows the AMT-1 to monitor an already established ARQ transmission between two other stations. This mode may need a few moments, or some assistance from the operator, to synchronize, but nevertheless is an extremely useful feature which is unique to AMTOR.

The AMT-1 TERMINAL UNIT

Description

The AMT-1 Terminal Unit contains everything that is needed to convert an amateur radio station and personal computer (or ASCII terminal) into a fully operational data communications system with optional error correcting facilities. It contains modern (AFSK modulator/demodulator) circuitry together with a microprocessor which handles AMTOR data transmission and also translates between AMTOR code and 8 unit, ASCII code.

An ASCII, RS232 interface has been chosen for the AMT-1 because of the extra CONTROL and ESCAPE code flexibility which this allows. Additionally, home computers and data terminals with ASCII interfaces are now available at very reasonable prices.

AMT-1 Amtor Terminal Unit

by 

As well as its AMTOR capability, the AMT-1 also incorporates facilities to transmit and receive standard RTTY and to transmit CW (morse code). A fourth "Transparent" or "Direct" mode is available, which connects the terminal directly to the modem. Using an ASCII terminal, it allows the AMT-1 to transmit and receive ASCII at any suitable Baud rate. This mode has wider potential dependent upon the ingenuity of the user!

The modem incorporates an active 4-pole receive band pass filter, feeding into an audio discriminator. It has a performance much higher than that normally offered by amateur RTTY terminal units. Transmit tones are crystal controlled. Frequency shift is 170Hz, using the U.S. recommended tone pairs:

2125Hz (MARK) 2295Hz (SPACE)

Full status indication is available via L.E.D. indicators on the front panel and in addition, an excellent 16 LED tuning indicator has been incorporated. In AMTOR Mode, this acts as a gated frequency analyzer and makes tuning extremely simple.

No switches will be seen on the front panel of the terminal unit. All control is via ESC and CONTROL functions sent from the terminal or computer. These are:

ESCAPE CODES

ESC A Enter AMTOR standby mode
ESC B Set Baud rate
ESC C Enter CW mode
ESC D Enter DIRECT mode
ESC I Set AMTOR SELCAL
ESC R Enter RTTY mode
ESC S Set CW speed
ESC T Set AMTOR Timeout

CONTROL CODES

AMTOR

CONT A Enter SELCAL of other station and commence calling
ESC Revert to configuration mode
+? Over
DELETE Letters Shift
CONT C Break into transmitting stations over (ARQ)
CONT D Closedown, revert to standby
CONT X Cancel buffer contents
CONT B FEC transmit
CONT F ARQ listen

RTTY

CONT A or B Transmit
CONT C or D Receive
DELETE Letters shift

In addition there are three internal links:

- XMIT AFSK polarity
- RX AFSK polarity - Select 10 or 75 Baud terminal interface (initially set at 110 Bauds)

Status codes are sent by the terminal unit which can be used to inform the computer of changes in the front panel display.

The AMT-1 will operate from an external regulated 12 volt D.C. supply capable of supplying at least 0.85 amps.

SPECIFICATION

Modes:

AMTOR	RTTY	CW	DIRECT
AMTOR (ARQ) AMTOR (FEC) AMTOR listen	1-100 Baud RTTY	1 - 99 w.p.m. (Transmit only)	(Can be used for ASCII at 110,300 Bauds)

Modulation Tones:

2125Hz (Mark) 170Hz Shift
2295Hz (Space)

Audio Input, Output:

Output level can be varied by means of an internal potentiometer. (Matches MIC and SPKR connections of most transceivers).

PTT Line Drive:

Open collector; will switch resistive and inductive loads to a maximum of 20V at 50mA.

Computer Terminal Interface:

75 or 110 Baud ASCII, (RS232 or TTL levels).

Internal Links:

INPUT Normal/Reverse
OUTPUT Normal/Reverse
75/110 Baud terminal data rate

Dimensions:

310mm. (W) x 60mm. (H) x 235mm. (D)
(12¼ x 2½ x 9¼ inches).

Power Supply Requirement:

+12.0 to +14.0 volts stabilized, at 850mA.
Input is protected against both reverse voltage and over voltage.

Connections:

DIN type audio connectors are supplied for input and output. A power supply connector is also supplied.

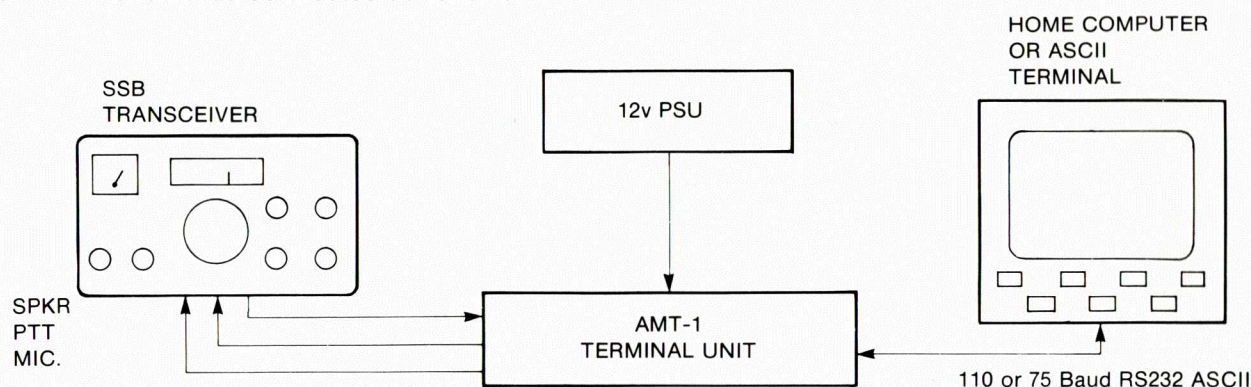
Temperature Range: +10° to 35° C.

AMT-1 Amtor Terminal Unit

by **AEA**

SYSTEM CONSIDERATIONS

The AMT-1 should be connected as follows:



Shielded leads should be used throughout to reduce R.F.I.

The transceiver should ideally have very good frequency stability (better than $\pm 30\text{Hz}$ drift about nominal). This level of stability is normally only achievable by crystal control or by means of a frequency synthesized VFO. In this case, a VFO resolution of 10Hz is required. Transceivers with a normal VFO can be used, but re-tuning to correct drift may be necessary from time to time. The AMT-1 is intended to be used with the H.F. transceiver operating in upper sideband (USB) mode. Interface to the transceiver is via audio tones and no RTTY filter is necessary in the transceiver itself.

Most communication modes offered by the AMT-1 operate with any transceiver. However, reasonably fast transmit/receive and receive/transmit switching times are essential to proper ARQ Mode operation. Most modern transceivers provide adequate performance in this respect — particularly those equipped for full break in CW operation. However, some transceivers may require minor modifications for successful ARQ operation under all circumstances. An internal pre-set allows slower transceivers to be used on ARQ, at the expense of

some reduction in the maximum workable distance.

Tips and hints are included in the AMT-1 instruction manual to enable you to work out any necessary modifications to your equipment. These are almost always simple (moving a wire or changing a component), but if you doubt your technical ability, consult your dealer.

Do not be concerned if your transceiver uses relays for transmit/receive changeover. Switching times are normally adequate, and they are generally rated for millions of operations. Large relays, however (such as those used in linear amplifiers), will probably not be fast enough, and barefoot operation of your transceiver in ARQ mode is recommended.

Only personal or home computers which have a proper RS232 serial interface operating at 75 or 100 Bauds in full or (less good) half duplex mode, and which can generate ESCAPE or CONTROL codes from the keyboard (or programmed function keys) are suitable for use with the AMT-1. Some low cost computers have badly implemented serial interfaces or none at all. Check their characteristics carefully prior to purchase.

The Commodore VIC-20 and VIC-64 work well with the AMT-1. Application programs are available.

Available from:

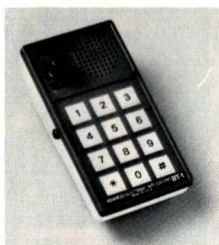
SPECIFICATIONS MAY BE CHANGED WITHOUT NOTICE OR OBLIGATION.

Advanced Electronic Applications, Inc. • P.O. Box C-2160 • Lynnwood, WA 98036 • (206) 775-7373 • Telex: 152571 AEA INTL

Morse Keyers & Trainers by AEA

AEA produces the finest Morse keyers and trainers in the world. All AEA keyers operate with any standard keyer paddle and offer selectable monitor tone, selectable dot and dash ratios, full weighting and selectable dot and/or dash memory. In addition, all our keyers offer full, semi-automatic or straight key modes. The keyers and trainers are keypad controlled which significantly reduces the complexity of operation for all the features offered. Each keyer has separate + and - keyed outputs for keying any modern transmitter. All keyers and trainers operate from 12 VDC (or 117 VAC with optional model AC-1 wall adaptor) which makes them ideal for portable operation. AEA microcomputer-based products are all subjected to a full burn-in and test prior to shipment, as well as being designed for maximum R.F. immunity.

NEW BT-1



The **BT-1 Basic Trainer** is a hand-held computerized unit which teaches the code one character at a time at 18 or 20 words per minute. The BT-1 contains a self-paced training program that allows serious students the possibility of learning Morse to 20 wpm in as little as one month! Each character represents a separate practice session in which the character is first introduced by itself, and then presented 50% of the time along with all previously learned characters. There are no tapes to memorize, wear out, or break. No programming skills are necessary; the BT-1 is very easy to use. The tone oscillator can also be keyed for sending practice. An earphone jack is provided for private listening. The BT-1 will go as high as 99 WPM in 1 WPM increments. A battery operated version, the BT-1P, is available with wall charger and internal NICAD batteries.

The **KT-3 Keyer-Trainer** unit uses the teaching program used in the BT-1 trainer. In addition, the KT-3 features a full function Morse automatic keyer for keying any modern transceiver, or for sending practice. Speed range is 18-99 wpm for transmitting and 1-99 wpm for training.

NEW KT-3



The **KT-2 Keyer-Trainer** is a computerized keyer with all the features shown above, plus a Morse proficiency trainer. It is designed to increase your existing code as quickly as possible. The unit can be set for beginning practice speed, ending practice speed, and duration of practice. The microcomputer does all the rest by gradually increasing the speed during the practice time selected. You can even select between fast code (Farnsworth) or slow code methods. The characters are sent in 5 letter groups, or random word lengths. Two levels of difficulty can be selected; common Morse characters or all English Morse characters. A 24,000 character answer book is provided for the 10 separate starting positions. There is also random practice mode for which no answers are available.

KT-2 Keyer Trainer



The **CK-2 Contester™ Keyer** is the lowest cost automatic keyer available featuring an automatic serial number generator for contesting. The CK-2 keyer features a large 500 character message memory that can be soft-partitioned into as many as 10 sections. An exclusive AEA edit mode makes it possible to correct mistakes made while entering messages or to insert words into previously established messages. Two different speeds can be set for fast recall in addition to a stepped variable speed control. The CK-2 features an automatic message repeat mode with variable delay-before-repeat for automatic CQ transmissions or TVI testing.

CK-2 Contester™



MM-2 MorseMatic™

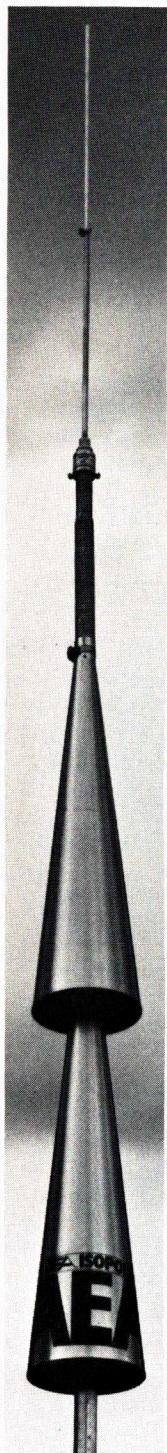


The **MM-2 Morsematic Keyer** represents the most sophisticated paddle keyer ever designed and features two powerful microcomputers. The Morsematic incorporates virtually all the features (except the preset and stepped variable speeds) of both the CK-2 and KT-2 shown above. In addition, the MM-2 offers an exclusive automatic beacon mode which is invaluable for meteor scatter, moonbounce scheduling, or beacon operation.

AEA Brings you the Breakthrough!

ISPOLE^{T.M.}

Antennas by



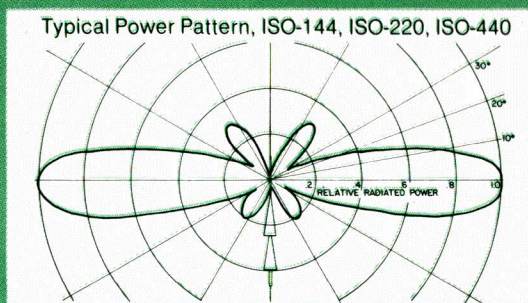
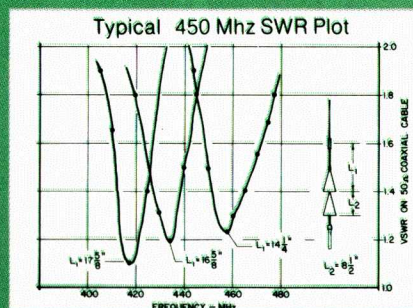
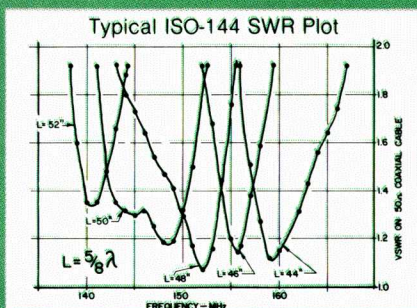
ISO-144
ISO-220

MASTS
NOT SUPPLIED

The IsoPole is building a strong reputation for quality in design and superior performance. Patented IsoPole conical sleeve decouplers offer many new design advantages.

All IsoPole antennas yield the **maximum gain attainable** for their respective lengths and a zero degree angle of radiation. Exceptional decoupling results in simple tuning and a significant reduction in TVI potential. Cones offer greater efficiency over obsolete radials which radiate in the horizontal plane.

The IsoPoles have the broadest frequency coverage of any comparable VHF base station antenna. This means no loss of power output from one end of the band to the other when used with SWR protected solid state transceivers. Typical SWR is 1.4 to 1, or better, across the entire band!

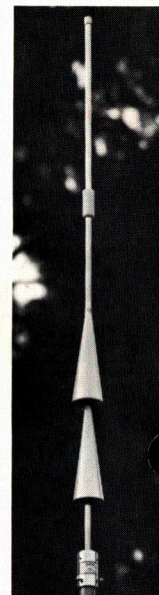


Outstanding mechanical design makes the IsoPole an excellent choice for a VHF base station antenna. A standard 50 Ohm SO-239 connector (Type N for ISO-440) is recessed within the base sleeve (fully weather protected). With the IsoPole, you will not experience aggravating changes in SWR with changes in weather. The impedance matching network is weather sealed and designed for maximum legal power. The insulating material offers superb strength and dielectric properties, plus excellent long-term ultra-violet resistance. All mounting hardware is stainless steel. The decoupling cones and radiating elements are made of corrosion resistant aluminum alloys. The aerodynamic cones are the only appreciable wind load and are attached directly to the support (a standard TV mast which is **not supplied**). You can buy a mast from your local hardware or Radio Shack store, for less than the shipping cost of a single 10' mast!

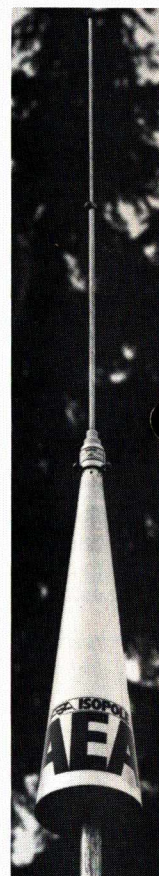
Operating on MARS or CAP? The IsoPole and IsoPole Jr. antennas will typically operate at least ± 2 MHz outside the respective ham band without retuning. However, by simple length adjustment, the IsoPoles can be tuned over a wider range outside the ham bands as shown in the SWR charts.

The IsoPole antennas are all impedance matched in the factory so that no field tuning is required. Instead of the typical 25-40 screws, the IsoPole has no more than 5 stainless steel screws to fasten, thereby significantly decreasing the time necessary for assembly and reducing the chance for errors.

Specifications subject to change without notice or obligation.



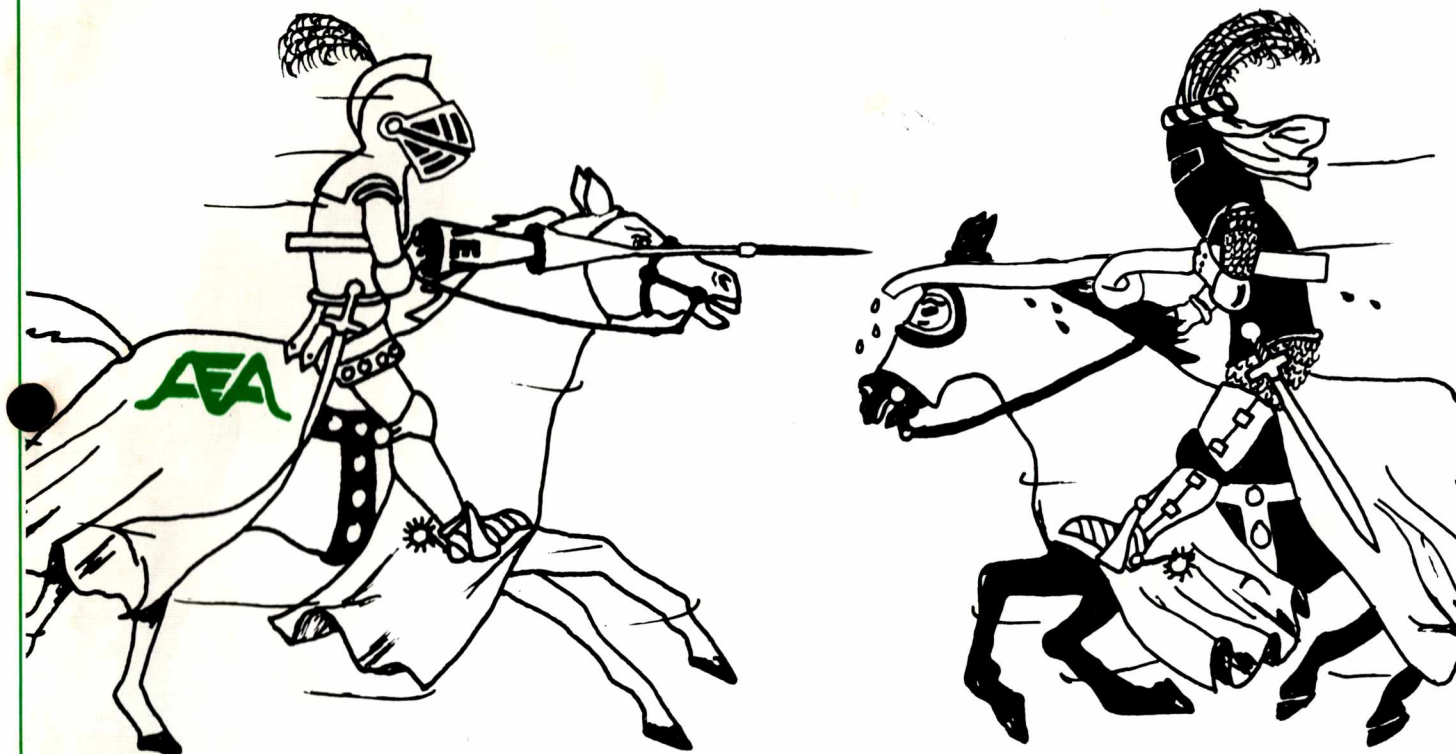
ISO-440



ISO-144JR
ISO-220JR

50 db GAIN

OVER A 1/4 WAVE WET NOODLE!



It sounds ridiculous..doesn't it? Amateur Radio advertising is not exempt from exaggeration. When facts are distorted by fabrication you may be induced to buy a product that ultimately is incapable of meeting the performance claimed by the manufacturer. Caveat Emptor (buyer beware)!

The **AEA IsoPole™** antenna has 3 db gain over a dipole in free space. This is an honest and supportable claim. Yet other manufacturers claim as much as a 7 db gain for their antennas using no reference standard or a 1/4 wave antenna as reference. The 1/4 wave is not a recognized reference used by **reputable** antenna engineers because it is most difficult to properly decouple in a repeatable fashion.

The **IsoPole** antennas offer **the maximum gain attainable** for the length of antenna. This is a bold statement and one we know we can stand behind!

For any linear array antenna to outperform the **IsoPole** by 3 db or more on-the-horizon gain, it would have to be at least 20 feet long! Anything less and you can bet that advertising deception is being used.

Before you buy a VHF or UHF base station antenna, get some good **honest** facts about VHF antenna design. Send for your **FREE**

copy of "Facts About Proper VHF Vertical Antenna Design" by Professor D.K. Reynolds, K7DBA. You'll be glad you did.

In the meantime, we would like to share with you some of the comments we have received from customers who are using the **IsoPole**.

Seattle, WA — Compact & easy to install, quality & keeps XYL happy -looks good!!

Half Moon Bay, CA — Found repeaters I only heard about before from my QTH — Excellent. Amazed at light weight and low cost...

Sturgis, SD — The IsoPole Antenna has exceeded my expectations.

Lumberton, NC — You really do what you say! The best 2 mtr. antenna I have ever owned!

La Habra, CA — Hooked up today, and it was a perfect match throughout the entire band. For the money, you can not go wrong.

Tok, AK — Truly a fine antenna, working better than the five element yagi it replaced.

Sacramento, CA — Assembly was remarkably easy. I needed an efficient, low profile antenna & your product fit the bill to a "T".

Warsaw, IND — AMAZED!!! Antenna ground mounted on required mast & outperforming a (R.R.) at 55' on top of tower.

Loris, SC — I'm a commercial radio salesman, and the IsoPole is THE antenna I recommend.

Seattle, WA — Works well — excellent. Had (R.R.) at 80'. With the IsoPole at 20 ft. I now hear repeaters and simplex I never heard with (R.R.) The IsoPole will soon be at 80'.

Freehold, NJ — It is everything your ad says and more.

Great Neck, NY — Amazing difference between (R.R.), 10 db or better, raise rept. never heard before — SUPER, 73 and thanks.

Richfield, OH — Works extremely well, broke a repeater at 100 mi using 150 mw !

Vernon, TX — (The dealer) said the antenna WAS THE BEST ON MARKET and I AGREE! It IS AN EXCELLENT antenna & works to specs -Thanks.

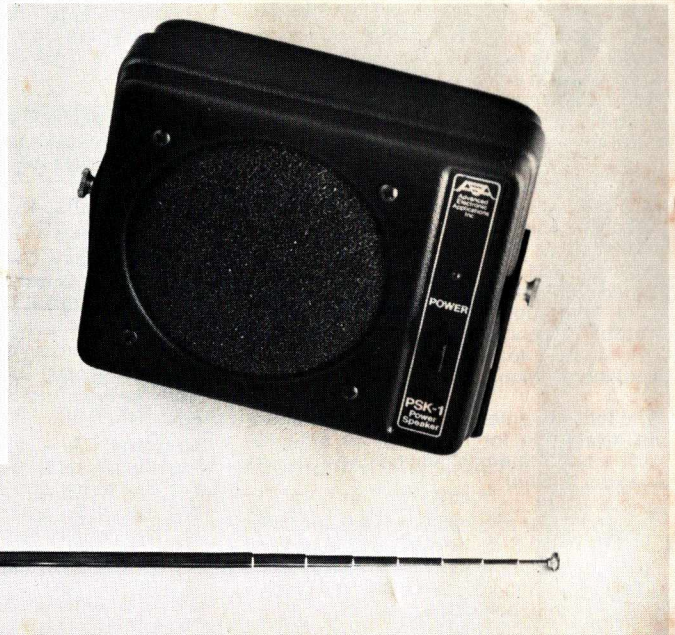
AEA
Brings you the Breakthrough!



Advanced Electronic Applications, Inc.
P.O. Box C-2160 Lynnwood, WA 98036

NEW ACCESSORIES FROM AEA

PSK-1 — The new AEA Power Speaker unit operates from any external 12 VDC, 500 ma source to supply high quality audio punch for your mobile or base station application. The PSK-1 is an excellent choice for using your handheld in a noisy mobile environment, or attractive enough to be used in the base station. The PSK-1 provides approximately 20 db of audio gain and will operate with any popular transceiver.



HR-1 — The AEA "Hot-Rod"™ telescopic antenna is designed to reduce the physical obtrusiveness relative to popular 5/8 wave telescopic antennas, plus it offers MORE GAIN. The antenna is made of high quality components and comes with a BNC connector for easy mating to most popular two meter hand-held transceivers. It also makes an excellent emergency base station antenna.